

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
2 March 2006 (02.03.2006)

PCT

(10) International Publication Number
WO 2006/023862 A1

(51) International Patent Classification:

G02B 6/122 (2006.01) G02B 6/136 (2006.01)
G02B 6/30 (2006.01)

(21) International Application Number:

PCT/US2005/029815

(22) International Filing Date: 22 August 2005 (22.08.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/603,843 23 August 2004 (23.08.2004) US

(71) Applicant (for all designated States except US): MOLEX INCORPORATED [US/US]; 2222 Wellington Court, Lisle, IL 60532 (US).

(72) Inventors: CHOUDHURY, Masum; 795 Olesen Drive, Naperville, IL 60540 (US). STANCZYK, Thomas, R.; 5800 Oakwood Drive, Unit 5-E, Lisle, IL 60532 (US). RICHARDSON, Dean; 3112 Wilmette Avenue, Wilmette, IL 60091 (US). DONVAL, Ariela; 14 Efroni Street, 48550 Rosh Haayin (IL). ORON, Ram; 7a Shikmin Street, 74064 Nes Ziona (IL). ORON, Moshe; 26 Busel Street, 76404 Rehovot (IL).

(74) Agent: BOSE, Romi, N.; Molex Incorporated, 2222 Wellington Court, Lisle, IL 60532 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

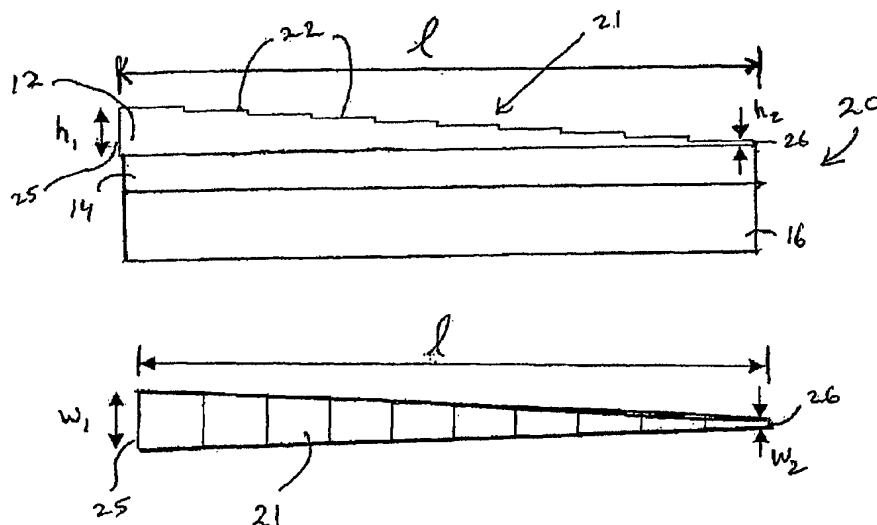
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: SYSTEM AND TAPERED WAVEGUIDE FOR IMPROVING LIGHT COUPLING EFFICIENCY BETWEEN OPTICAL FIBERS AND INTEGRATED PLANAR WAVEGUIDES AND METHOD OF MANUFACTURING SAME



(57) Abstract: A tapered waveguide optical mode transformer (20) includes a tapered core formed on a planar substrate structure (16). To vertically taper the core (21), steps (22) are etched into the top surface of the core. The steps have depths and lengths along the optical axis of tapered waveguide that are selected to transform the optical mode characteristics of a desired optical fiber to the optical mode characteristics of a desired planar waveguide. The core can also be tapered horizontally to form a 2-D tapered waveguide. The tapered waveguide can be integrally included in planar lightwave circuits (PLCs) to reduce light coupling losses between optical fibers and the PLC waveguides.